

# ***Georgia Tech Precision Machining***

***<http://pmrc.marc.gatech.edu/>***

by

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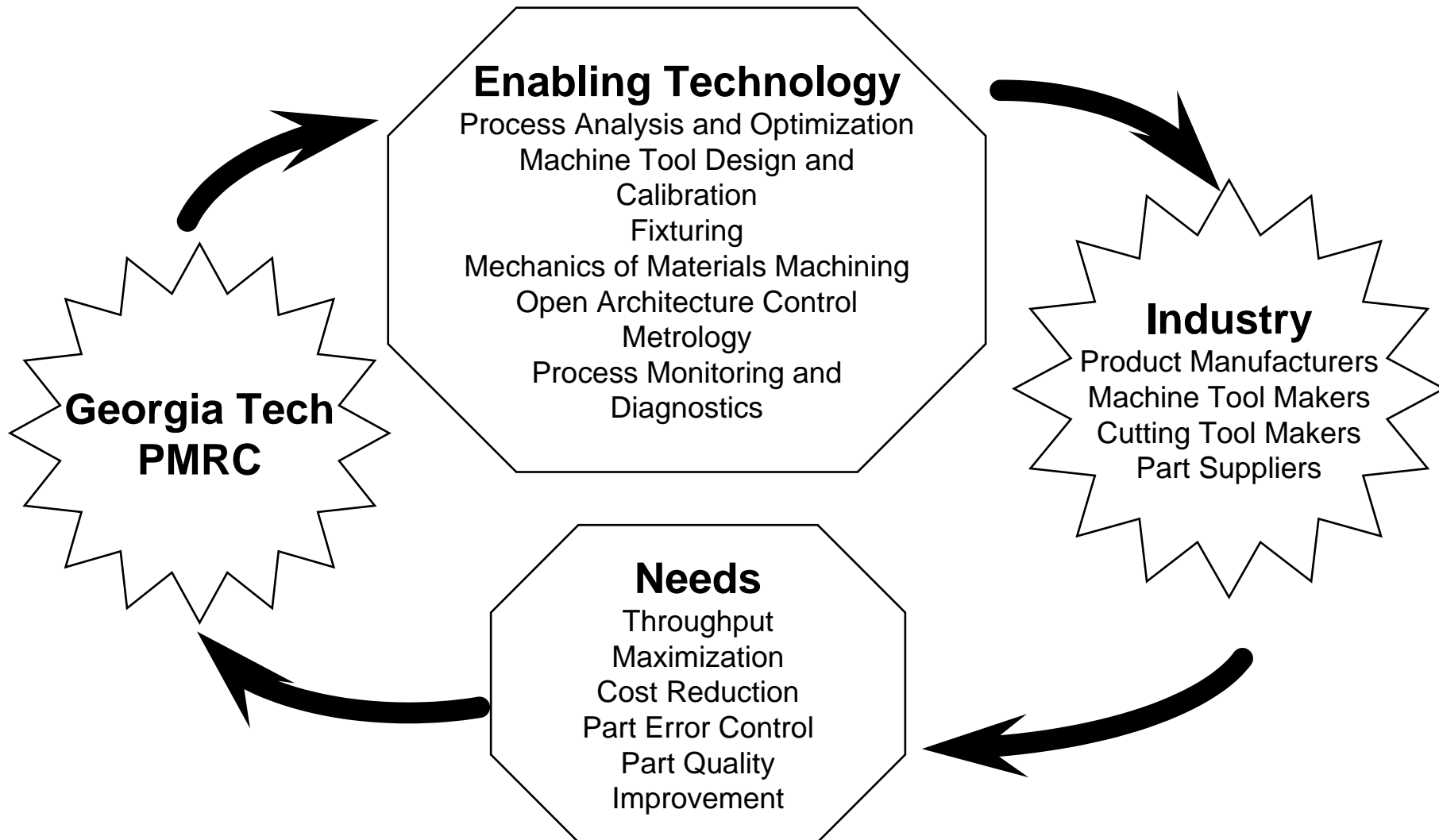
and the

**Manufacturing Research Center**

Georgia Institute of Technology

Atlanta, GA 30332-0405

# ***PMRC Mission and Objectives***



# ***Research Topics***

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## **Process Analysis and Optimization**

Deflection of tool, machine and part; dynamic stability; cutting force prediction; machining process optimization; tribology in machining.

## **Open Architecture Control of Machine Tools**

PC-CNC systems; proprietary process models and process control strategies; plug and play sensors and controllers.

## **Environmentally Conscious Machining**

Effects of cutting fluid, chip, and scrap on factory ecology; control and optimization of machining process by-products.

## **Machine Tool Design and Calibration**

Machine tool components and structures; fixturing; machine stiffness and accuracy; thermal deformation; positioning error; tool condition; static and dynamic calibration; error mapping; micro machine tool design.

## **Mechanics of Materials in Machining**

Cutting forces; surface integrity; metals, super alloys, intermetallic compounds; micromachining.

## **Metrology**

On- and off-line characterization of part surface, form, and mechanical properties; and coordinate measurement methodologies; micro metrology.

## **New Process Development**

Micro grinding; laser assisted micro machining.

## **Process Monitoring and Diagnostics**

Sensors and signal processing; deterministic and heuristic diagnostics; direct and indirect measurement of tool wear; tool breakage; tool runout; and chatter.

# ***Modes of Interaction***

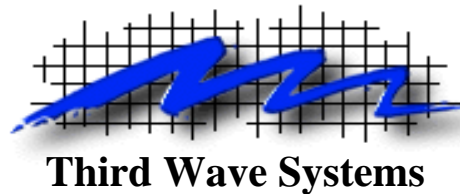
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- ❖ Research projects funded via industry/government contracts, grants to individual PMRC faculty
- ❖ Teaming with industry/national lab for government contracts
- ❖ Industry internships for undergraduate and graduate students
- ❖ Short-term on-campus internships for industry engineers

# Research Sponsors/Partners

## Georgia Tech Precision Machining Research Consortium



# ***New Industry/Govt. Sponsors (2005-2006)***

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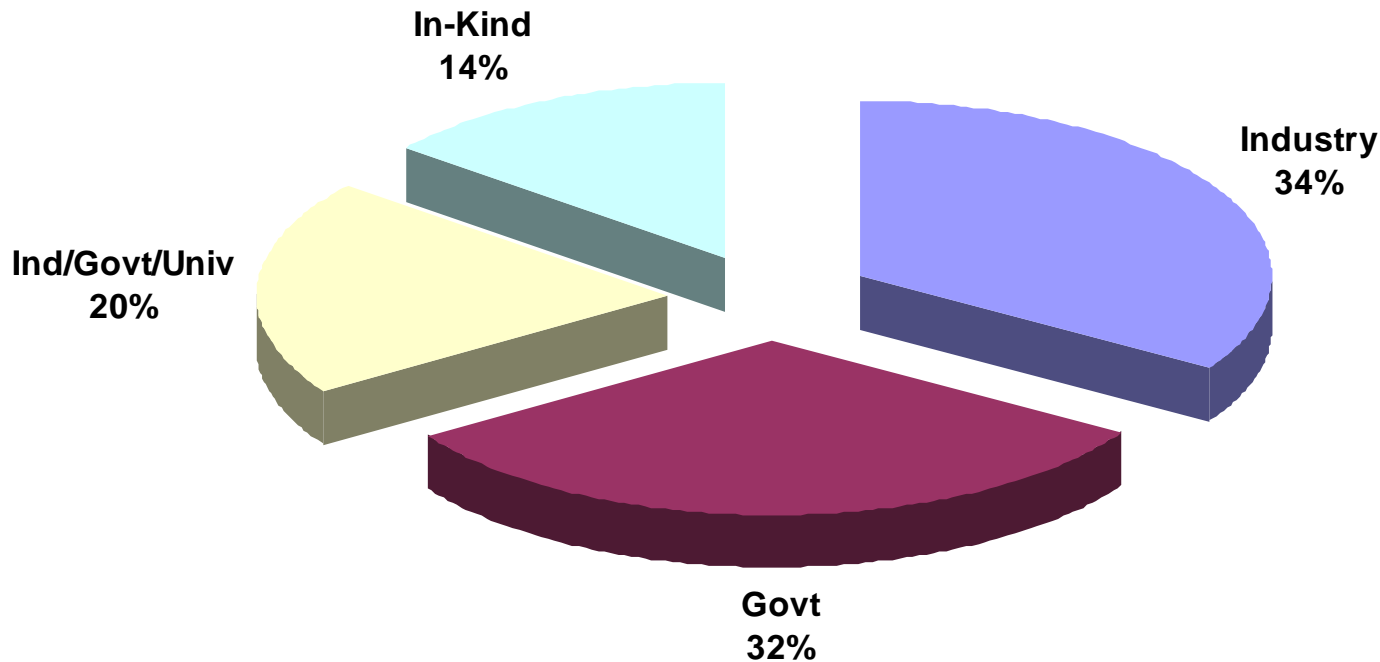
- ❖ Alcoa Fastening Systems
- ❖ Rolls Royce
- ❖ Caterpillar Precision Seals
- ❖ GibbsCAM
- ❖ Shanghai Machine Tool Company
- ❖ Los Alamos National Labs

# ***Funding Update***



Net funding till present: > \$5.7M

~\$432,000 in new funds in CY05-06 + Major in-kind contribution of GibbsCAM software



# ***Plans for 2006-2007***

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- ❖ Seek industry partners for NSF I/UCRC
- ❖ Attract new industry sponsors and projects
- ❖ Seek industry partners to go after large funding opportunities (e.g., DoD, DoE, STTR, NSF GOALI, etc)
- ❖ Develop partnerships with machine tool vendors to obtain new machines via consignment/donation agreements



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